G7: A Framework For International Cooperation In Medical Informatics

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ABSTRACT

The world's major economic powers, the G7, have initiated a collaborative International research and demonstration program to exploit the benefits of information and communications technology for society. The Global Healthcare Applications Project (GHAP) is investigating a variety of informatics applications in disease specific domains, telemedicine, and multilingual textual and image database systems. This paper summarizes the nine GHAP sub-projects undertaken to date, with emphasis on those in which the U.S. is a participant. The growing use of smart card technology, especially in Europe, is adding new impetus for similar medical and health experiments in the U.S. A pilot project now underway in several Western states is described.

THE GROUP OF SEVEN

Beginning in the 1970's, the world's major economic powers have been meeting as a group, the so-called G7, to discuss policy issues of common interest. These nations are the United States, Canada, Japan, United Kingdom, France, Germany, and Italy. The first annual "summit" meeting attended by heads of state was convened in Rambouillet, France in November 1975; Birmingham, England was the site of the May 1998 meeting recently attended by President Clinton. At last year's meeting in Denver, Colorado provisions were made to add Russia to an emerging "G8". The European Community continues to play a particularly active role in G7/8 business, representing the interests of other nonmember countries on the continent, funding pilot demonstration projects, and serving as the executive secretariat for a number of these activities.

The G7 group was originally intended to deal with economic issues such as high inflation, macroeconomic coordination, and trade policy. At G7 meetings political Issues were also discussed, at first informally, and then, in the Eighties, in a structured way. With the dissolution of the Soviet Union, the Nineties have seen the G7 nations concentrate more on "transnational" issues that have economic and political aspects. Examples are drug trafficking, the environment, nuclear non-proliferation, and the fight against terrorism.

Towards A Global Information Society

It is against this background that at the Naples G7 Summit in July 1994, the G7 leaders encouraged the development of a "worldwide information society" that would exploit the benefits of information and communications technology. At a follow-up ministerial level conference held in Brussels in February 1995, and attended by Commerce secretary Ron Brown, these discussions addressed underlying issues of "regulatory and competitive frameworks; development of the infrastructure and access to it; and essential applications including concern for social, societal, and cultural aspects of the information society." Along with governmental representatives having responsibility for national telecommunications and information policy, private sector participants from both the manufacturing and service sectors were also present to showcase the benefits and capabilities of information technology.

THE PILOT PROJECTS

Eleven pilot projects (or "themes") were identified where international cooperation could be an asset. These projects "aim at demonstrating the potential of the Information Society for the well-being of all citizens, and stimulate deployment." The G7 Information Society Pilot Projects, and their respective objectives, are highlighted below:

Project 1: "Global Inventory" (coordinated by the European Commission and Japan). Create and provide an electronically accessible multimedia inventory of information regarding major national and international projects and studies relevant to the promotion and the development of the global information society; and assess the social, economic and cultural factors impacting on its development.

Project 2: "Global Inter-operability for Broadband Networks" (coordinated by Canada, Germany, and Japan). Facilitate the establishment of international links between the various high-speed networks and testbeds supporting advanced applications.

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Project 3: "Cross-cultural Education and Training" (coordinated by France and Germany). Provide innovative approaches to language learning.

Project 4: "Electronic Libraries" (coordinated by Japan and France). Constitute from existing digitization programs a large distributed virtual collection of the knowledge of mankind.

Project 5: "Electronic Museums and Galleries" (coordinated by Italy and France). Accelerate the multimedia digitization of collections and ensure their accessibility to the public and as a learning resource for schools.

Project 6: "Environment and Natural Resource Management" (coordinated by the United States). Increase the electronic linkage and integration of distributed databases of information relevant to the environment.

Project 7: "Global Emergency Management" (coordinated by Canada). Encourage the development of a global network to enhance the management of emergency response situations, risks and knowledge.

Project 8: "Global Healthcare Applications" (coordinated by the European Commission, France, Germany and Italy). Demonstrate the potential of information technology in the fight against major health scourges.

Project 9: "Government Online" (coordinated by United Kingdom and Canada). Exchange experiences and best practices on the use of online information technology for conducting administrative business between governments, companies and citizens.

Project 10: "Global Marketplace" (coordinated by the European Commission, Japan and United States). Contribute to open information exchange and demonstrate the interoperability of electronic trading services on a global scale.

Project 11: "Maritime Information Systems" (coordinated by the European Commission and Canada). Integrate and enhance environmental protection and industrial competitiveness for all maritime activities, develop applications in the areas of safety, intelligent manufacturing andlogistics networks.

Published references to G7 activities are limited largely to Internet-accessible electronic resource sites on the World Wide Web. For additional information, the reader is invited to consult the following key sources for currently available information, future updates, and related Web sites: The European Commission in Brussels <www.ispo.cec.be/g7/> and the G7 Research Group at the University of Toronto <www.library.utoronto.ca/www/g7/>.

The Global Healthcare Applications Project (Theme 8)

For the Global Healthcare Applications Project (GHAP), the intent at the research level is to develop and test feasibility "sub-projects" that are formally proposed and peer reviewed by GHAP principals ("national coordinators") on an initial and continuing basis. Each sub-project is independently funded and structured as either a collaborative project activity or a "concerted action" (i.e., a lesser level of commitment than is implied by a formal project). Sub-projects are carried out under the leadership of a national governmental representative, with participation invited from academic and industrial interests, each spanning several G7 member nations. The European Commission's DGXIII functions as the GHAP secretariat and chair, and has been the principal funder of several of the European-led sub-projects. No centralized funding mechanism exists in the U.S., Canada or Japan. All feasibility work is to be completed by GHAP at the end of 1999. Continuing G7/8 involvement thereafter with those sub-projects achieving operational status remains to be determined.

For the U.S., overall coordination of G7 activities is provided by the White House's Office of Science and Technology Policy. In 1996, Health and Human Services Secretary Donna Shalala designated Dr. Donald Lindberg as the U.S. national coordinator for the G7 Global Healthcare Applications Project (GHAP).

With this appointment, the United States took a markedly more active role in GHAP events. In January 1997, the U.S. hosted at the National Library of Medicine the annual meeting of the GHAP national coordinators, sub-project leaders, participants and observers from non-G7 nations. In March 1998, the GHAP annual meeting was hosted in Tokyo at the National Cancer Center. Dr. Elliot Siegel represented the U.S. The following is a brief summary of those sub-project activities in which the U.S. participates:

Sub-Project 3: "Improving Prevention, Diagnosis and Treatment of Major Cardiovascular Diseases" (launched in February 1995, Italy coordinator). Integrates health economics analysis with standard clinical databases. The U.S. is seeking to incorporate the informatics-related work of the NIH-sponsored National Heart Attack Alert Program (NHAAP), whose objective is to decrease the time between onset of symptoms of acute

myocardial infarction and the initiation of thrombolytic therapy.

Sub-Project 4: "International Concerted Action on Collaboration in Telemedicine" (launched in February 1995, revised in January 1997, Canada coordinator). Primarily a framework for information exchange; pilot test planned on a limited scale. Specific topics scheduled for formal discussion as forums include, "Impacts of Tele-health on Healthcare Management; Evaluation of Cost-Efficiency of Applications; Technical Quality and Standards (to be hosted by NLM); and Medico-legal Aspects of National and International Applications."

Sub-Project 5: "Enabling Mechanisms for a Global Healthcare Network; Including 5b, Internet Connectivity" (launched in February 1995, UK coordinator; 5b added in January 1997, US coordinator). NLM has developed and is testing methods and metrics for monitoring and evaluating Internet performance from the user's perspective, with the goal of providing an informed basis for planning and decision-making regarding Internet communications and web-based healthcare applications. Data have been collected from locations in 27 countries, including all of the G7.

Sub-Project 6: "International Harmonization of the Use of Data Cards in Healthcare" (launched in February 1995, France and European Commission coordinators). This project is demonstrating interoperability between technical platforms in use worldwide, and serves as a means for sharing experiences. Many millions of these "smart cards" have already been distributed in Europe as health care provider and patient data records. Two smaller scale U.S. smart card projects will be fielded.

Sub-Project 8: "Multilingual Anatomical Digital Database" (launched in January 1997, US coordinator). The purpose of this project is to produce multilingual anatomical labels, which will be used to enhance the multilingual capabilities of the Unified Medical Language System (UMLS), and make possible multilingual access to the Visible Human databases - knowledge structures transparently linked to visual knowledge forms. Plans are in place with collaborators in Japan, Germany, and Italy.

Sub-Project 9: "Medical Image Reference Center" (launched in January 1997, Japan coordinator). A systematic collection of clinical and pathological images in cancer and cardiovascular diseases intended to support medical education, research, and patient care. Collaboration and interoperability with other international image databases is sought. NLM is establishing a Visible Human database mirror site in Japan as part of this effort.

Three other GHAP sub-projects have either been completed or the U.S. is not an active participant at the present time. They are:

Sub-Project 1: "Towards a Global Public Health Network" (launched in February 1995, completed in February 1997, Germany coordinator). Study clarified requirements for the design and development of databases supporting the exchange of communicable diseases surveillance information, intended for public and limited dissemination.

Sub-Project 2: "Improving Prevention, Early Detection, Diagnosis and Treatment of Cancer" (launched in February 1995, France coordinator). Pilot implementation underway demonstrating utility of networked cancer centers for screening, remote consultation and continuing medical education.

Sub-Project 7: "Evidence and Effectiveness" (launched in May 1996, Canada coordinator). Seeks to develop a prospective register of randomized controlled clinical trials; protocol implemented for stroke management.

G-7 Points the Way in Smart Card Technology

The use of data cards in healthcare is rapidly becoming an accepted and even a ubiquitous technology in Europe, fueled in part by certain economic advantages not generally found in the U.S. As a participant in the GHAP sub-project 6 which is demonstrating interoperability between technical platforms, the U.S. has learned a great deal from our G-7 involvement that may very well translate into accelerated diffusion and adoption of smart card technology for medical applications in the U.S. Daniel Maloney of the Department of Veterans Affairs and Dr. Lawrence Kingsland at NLM are spearheading this effort.

In Europe, memory chip cards are widely used as pre-paid phone cards effectively eliminating the cost and inconvenience of coin use. Credit cards in France contain chips allowing less costly off-line approval of credit card transactions. Healthcare applications have been a logical extension of this technology. A German national initiative has distributed over 70 million cards to all citizens containing ID, demographic and insurance data to decrease administrative costs. France will expand this concept, and this year will begin to distribute a computer chip card to healthcare professionals and to citizens; the professional card will include keys for accessing data on the card or on a network, and employ a digital signature.

Canada has announced similar plans; its patient card will also contain keys for ID and signature that will permit electronic business transactions with government agencies.

Data cards in common use today carry information in machine-readable form in a magnetic stripe, a bar code, an optical memory strip, an electronic serial memory chip or a computer chip. The latter "smart card" technology has a typical storage capacity of 3K to 8K characters and cost between $3.50 and $15.00. Larger capacity cards are being introduced at higher cost. Readers are now available for about $70, with vendor promises in the $20 range soon. Experimentation and demonstration projects are clearly needed.

The Health Passport Project: A Case Study

In the U.S., the Health Passport Project (HPP) is testing the use of smart card technology in several western states to put important health and demographic information at the fingertips of patients and their healthcare providers. In a demonstration coordinated by the Western Governors' Association, the project initially involves public health programs that serve pregnant women, mothers and children. Health cards will be distributed to an estimated 22,000 individuals in Bismarck, North Dakota; Cheyenne, Wyoming; and Reno, Nevada.

The Health Passport system will provide patient-controlled cards containing a limited set of demographic and medical information common to participating programs, and a network of personal computers, point of service terminals, and kiosks to provide secure access to information on the cards. Privacy will be enhanced by the use of provider cards.

The cards qualify the holders for social services and benefits, such as food provided under the Women, Infants, and Children (WIC) program, Medicaid benefits (that vary between the three test sites), and some preventive medical services such as immunization.

The advantages expected from the card system include simplified record keeping by the donor agencies; improved compliance with regulations and reduction in travel; increased empowerment of the individual client because of the transportability of the benefits of the card; and improved medical record keeping, at least with respect to family immunization records.